SECTION 07600

ROOF SHEET METAL AND FLASHING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Roof sheet metal and flashing as shown or specified, and as required to provide a complete installation.

B. Related Work Specified in Other Sections
   1. Metal flashings in conjunction with metal siding, including coping at top of metal siding, and metal flashing at bottom of metal siding (except directly above roofing) - Division 7.
   2. Prefabricated metal roof accessories - Division 7.
   3. PVC roofing and coated roof flashings – Division 7.

1.2 SUBMITTALS

A. Furnish submittals for items that are identified in this Section by a different typeface and a bracketed code (e.g., *Item [L]*). Refer to Division 1 General Requirements for definition of codes for types of submittals and the administrative requirements governing submittal procedure. General submittal requirements pertaining to this Section are specified herein under this Article.

B. Fabricated Items: Submit shop drawings to show all fabricated items, including thicknesses and dimensions of all parts and methods of assembling, joining, seaming and securing of roof sheet metal and flashing work; give information necessary for adjacent and related work.

C. Standard Items: Submit product data for standard manufactured and catalogue items.

D. Aluminum Samples: Submit for color, texture and finish of exposed surfaces. Show extremes of variation of color and of texture, due to normal manufacturing tolerances.

E. Roof Sheet Metal and Flashing Guarantee: Furnish in an approved form, warranting roof sheet metal and flashing work against failure or leakage of any kind for a period of 2 years from date of final acceptance of the project, covering all defects in materials and workmanship. State that all sheet metal work that becomes defective or leaks, during the guarantee period, will be repaired, promptly, to the requirements of these Specifications and that covering construction will be removed and replaced as required to perform the repairing or replacing work, all at no cost to the Owner.

1.3 QUALITY ASSURANCE

A. Sheet Metal Flashing and Trim Standard: Where not specifically detailed or specified, comply with SMACNA's "Architectural Sheet Metal Manual". Conform to dimensions and profiles recommended unless more stringent requirements are indicated.

PART 2 PRODUCTS

2.1 GALVANIZED STEEL

A. Galvanized Steel Sheet: Mill phosphatized, minimized spangle, zinc coating designation G90 per ASTM A 525.
   1. Primer Finish: Shop-applied prime coat of zinc-rich, rust-inhibitive priming paint both sides.
   2. Polyvinylidene Fluoride Finish: Factory-applied baked-on polyvinylidene fluoride resin finish containing not less than 70% Kynar 500 or Hylar 5000 resin, with minimum total dry film thickness of 1.0 mil (0.2 mil primer and 0.8 mil finish), in standard color as selected per approved samples.

2.2 ALUMINUM

A. Sheet: Per ASTM B 209, alloy 3003-H14, unless other alloy and temper are approved.
   1. Aluminum Association AA-M12C22A31 (clear etch and anodize).
   2. Aluminum Association AA-C22R10 (etch and lacquer).
   3. *Polyvinylidene Fluoride Finish [S]*: Factory-applied baked-on polyvinylidene fluoride resin finish containing not less than 70% Kynar 500 or Hylar 5000 resin, with minimum total dry film thickness of 1.0 mil (0.2 primer and 0.8 finish), in standard color as selected per approved samples.

B. *Color-Anodized Aluminum Sheet [S]*: Of correct alloy to produce the specified finish and of temper suitable for the Work, with color-anodized finish per Aluminum Association AA-M12C22A34 in the following color to match siding.

C. Extrusion: Minimum 1/8 inch thick, of profiles shown, Alloy 6063, Temper T42, unless other alloy and temper are approved.
   1. *Polyvinylidene Fluoride Finish [S]*: Factory-applied baked-on polyvinylidene fluoride resin finish containing not less than 70% Kynar 500 or Hylar 5000 resin, with minimum total dry film thickness of 1.0 mil (0.2 primer and 0.8 finish), in standard color as selected per approved samples.

D. *Color-Anodized Aluminum Extrusions [S]*: Minimum 1/8 inch thick, of profiles shown, of correct alloy to produce the specified finish and of temper suitable for the work, with color-anodized finish per Aluminum Association AA-M12C22A34 in color to match existing building.

E. Coat with bituminous paint, all aluminum surfaces in contact with dissimilar metals, masonry, mortar or concrete.

2.3 STAINLESS STEEL

A. Stainless Steel Sheet or Strip: AISI Type 302 or 304 alloy fully annealed to dead-soft temper, 2D finish, per ASTM A 240.

2.4 ZINC COATED STEEL SHEET

A. Zinc-Coated (Galvanized) Steel Sheet: Per ASTM A653, G90 coating designation, structural quality, mil phosphatized for field painting.

2.5 FASTENERS

A. Nails: Large head, barbed shank of No. 12 gage minimum with sharp point and of length to develop holding power for service intended.

B. Screws: Large oval head, for securement in wood or metal as required, of length to develop holding power for service intended.

C. Machine Bolts: With expansive sleeves for fastening in concrete or masonry, with nuts for fastening to metal framing or wood. Where bolt head is exposed to view, provide snap-on or integral colored plastic head and colored combination metal - neoprene washer to match the color finish of the flashing.

D. Fasteners: Furnish for use with specific sheet metals as follows:
   1. For Galvanized Steel: Galvanized steel, cadmium-plated steel, or stainless steel of 304 or 302 alloy.
   2. For Aluminum: Hard aluminum alloy or stainless steel of 304 or 302 alloy.

2.6 MISCELLANEOUS MATERIALS

A. General: Provide protective coatings, fasteners, solder, dissimilar metal protection, sealants, and other items as required for watertight installation.

B. Felt Underlayment: Asphalt-saturated organic felt per ASTM D 226, Type II (No. 30), nonperforated.

C. Sealing Tape: Polyisobutylene compound sealing tape with 100% solids and pressure sensitive release-paper backing. Provide nontoxic, nonstaining permanent elastic tape.

D. Elastomeric Sealant: Elastomeric polyurethane polymer sealant per ASTM C 920, as required for watertight installation.

E. Butyl Sealant: Single-component, solvent-release butyl rubber sealant per ASTM C 1311, for use in joints with limited movement .

F. Epoxy Seam Sealer: Aluminum seam-cementing compound, 2-part, noncorrosive, as recommended by manufacturer for exterior nonmoving joints.

G. Bituminous Coating: SSPC-Paint 12, cold-applied asphalt mastic, compounded for 15-mil (0.4-mm) dry film thickness per coat.

2.7 MINIMUM DIMENSIONS AND THICKNESSES

A. General
   1. Provide sheet metal in not less than the minimum thicknesses and weights specified in the following paragraphs.
   2. Provide zinc alloy steel of same gage as galvanized steel.

2.8 MINIMUM GAGES

A. Galvanized Steel: Use minimum .0276 inch for all items except:
   1. Use .0336 inch gage for continuous cleats.
   2. Use ,0396 inch gage for roof edge strips, 1-1/4 inches wide.
   3. Use .0336 inch gage for fascias over 5 inches high.
   4. Use .0396 inch gage for rain conductor downspout and gutter hangers.

B. Stainless Steel: Use minimum .015 inch thick for all items except:
   1. Use .018 inch thick for continuous cleats.
   2. Use .025 inch thick for roof edge strips, 1-1/4 inches wide.
   3. Use .018 inch thick for fascias over 5 inches high.
   4. Use .037 inch thick for rain conductor downspout and gutter hangers.

C. Aluminum: Use minimum .032 inch thick for all items except:
   1. Use .050 inch thick for continuous cleats.
   2. Use .050 inch thick for roof edge strips, 1-1/4 inches wide.
   3. Use .050 inch thick for fascias over 5 inches high.
   4. Use .080 inch thick for rain conductor downspout and gutter hangers, and use .040 inch thick for splash pans.

2.9 FABRICATION

A. General: Fabricate metal trim and flashing per the recommendations in SMACNA's "Architectural Sheet Metal Manual". Where possible, shop fabricate metal trim and flashings. Verify via accurate field measurements prior to flashing and trim shop fabrication.

B. Fabricate metal flashing and trim in gage or weight as specified or as indicated on the Drawings.
   1. Aluminum Seams: Fabricate nonmoving seams via flat-lock interlocking joints. Seal with epoxy type sealant.
   2. Non-aluminum Seams: Fabricate nonmoving seams via interlocking flat-lock joints. Tin edges to be soldered.

C. Sealed Joints: Seal movable, non-expandable metal joints with elastomeric sealant per recommendations of SMACNA.

D. Exposed to View Joints: Provide concealed type fasteners at all exposed flashings and trim where possible unless otherwise indicated or detailed.

E. Provide cleats and accessories from same metal or from a, noncorrosive compatible metal. Thickness shall be not less than that of base flashing metal being secured.

F. Soldering: Tin all edges of sheet metal to be soldered, on both sides, for a minimum width of 1-1/2 inch. Sweat all soldered joints full and remove all soldering solutions at completion. Butter joints to be sealed with roofing mastic, full area of overlap, using sufficient amount of mastic so that joint is filled, but not overflowing. Do not solder aluminum; aluminum greater than .040 inch thick can be welded.

PART 3 EXECUTION

3.1 GENERAL

A. Do not fasten sheet metal through exposed surfaces of sheet except where so approved and where other methods of fastening are impractical. Seal exposed heads of nails or screws watertight with sealant colored to blend with surrounding metal or clear where exposed to view from ground or adjacent occupied area; roofing mastic where no apparent visual exposure is anticipated. Solder all heads of exposed nails in all sheet metal materials except aluminum.

B. Locate expansion joints so as to prevent defects or damage due to thermal movement while still remaining watertight.

C. Turn out the stiffened free edge of horizontal runs of flashing at a 45 degree angle to form drips and to engage continuous cleats behind same.

3.2 COPING

A. Provide extruded aluminum coping of profile detailed and secure in place with concealed continuous cleats to allow for thermal movement. Install joint covers to maintain watertight installation.
   1. Provide concealed joint covers.

B. Provide sheet aluminum coping of profile shown, to extend a minimum of 4 inches down over the exposed wall surface and a minimum of 3 inches over the base flashing, except where greater dimensions are shown. Stiffen the free edges and bend out to form a drip. Provide a continuous, concealed slip-type cleat and install the coping unit over the parapet wall and engage the coping around the cleat on each side of the parapet. Install concealed joint covers at all joints, centered on joint and lapped under adjacent sections. Provide sealant at all joints to make weathertight.

3.3 CAP FLASHINGS

A. Form cap flashings to provide spring action of the free edge against the base flashing and secure free edge with concealed continuous cleats. Extend cap flashing over base flashing a minimum of 3 inches.

B. Where cap flashings are secured directly into masonry joints or flashing groove in concrete, form the flashing with a 1-1/2 inches wide horizontal leg with 1/4 inches turn-up at the back and insert into horizontal joint. Secure the flashing in place by forcing metal wedges of same material or lead wedges, into the joint at 18 inches on center and fill the joint with sealant.

C. Where cap flashings are secured into prefabricated flashing receivers, furnish 2-piece flashing assembly shaped to interlock with each other. Furnish the receiver portion for embedment in the wall. Install the exposed flashing portion into the receiver, snapping it into place to secure it in the receiver and to provide spring action of the flashing against the base flashing.

D. Where cap flashings are secured to walls with no provision for receiving the cap flashing, secure the cap flashing with continuous pressure bars. Secure pressure bar to the wall by bolting at 12 inches centers through the flashing, with flashing extending above top of pressure bar a minimum of 1/2 inch. Turn the top of the flashing, above the pressure bar, out at a 45 degree angle and fill the space with sealant.
   1. Where cap flashings are secured to wood nailers and concealed cleat fastening is not possible, face nail the flashing in place at 3 inches on center.
   2. Provide cap flashings on top edge of new roof curbs as shown; extend down inside of curbs. Where indicated, provide sheet metal closure liners inside new field-fabricated roof curbs. Provide sheet metal covering over temporary plywood covers at curbs for future roof-mounted equipment such as fans, etc.

3.4 ROOF PENETRATION COLLAR FLASHINGS

A. Provide sheet metal collar flashings around roof penetrating items in built-up roofing such as pipes, conduits, equipment support legs, equipment platform legs, etc., secured with stainless steel clamping band and calked with sealant around top edge of outer collar. Unless shown otherwise, provide 2-piece collar flashings consisting of an inner collar with 6 inch wide roof flange for stripping into the built-up roofing and an outer collar extending down over the inner collar and having top edge flanged out 45 degrees and clamped above the top edge of the inner collar.

3.5 CLEANING AND PROTECTION

A. Clean all exposed flashing surfaces including excess sealants and solder. Neutralize flux materials.

B. Replace any damaged flashings due to construction operations.

C. Touch up any scratched or damaged surfaces with paint to match existing adjacent new metal flashing and trim surfaces.

END OF SECTION

Revision History	
Date	**Rev. No.**
A	0
B	0
C	0
D	0
E	0
F	0
02-19-09	0

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